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ON THE

STONE IMPLEMENTS

OF THE

INDIANS OF NORTH AMERICA,

WITH A

Classification and description of the methods of making them.

BY FRANKLIN PEALE.

R E A D J U N E 21, 1861.

The implements of stone used by the inhabitants of this continent previous to the advent of the European colonists, seem to be divided naturally into four branches or compartments.

In the first are those implements which were used for the preparation of food, and consist of pestles, mortars, and mill or grinding stones.

The second embraces hammers, axes, adzes, and tomahawks, used for breaking flints, &c., cutting timber, dressing skins, and all the various uses which their manner of living required. It also embraces the sharp flakes used as knives for skinning, scalping, and cutting generally.

The third division comprises the spear and arrow-heads, used in war, and for the chase; and, lastly,

The fourth, which includes articles of ornament, personal decoration and luxury!

In the pursuit of this subject we are left almost entirely to our own conclusions in regard to the method of construction, from observed indications on the articles themselves, but not entirely so; many tribes still remain upon the borders of civilization, and others have so recently given way to the advances of the civilized race, that some of these processes or arts have been witnessed by travellers, and their observations recorded for our information and instruction. Wherever these observations occur, they are very satisfactory in confirming what would otherwise be conjecture alone, sustained more or less substantially by the indications which the works themselves present to the eye.

The conchoidal fracture of silicious minerals in recognized forms, are sure indications of the work of man's hands. This most important fact is particularly so in this day of research, when such works

are being found in geological positions hitherto considered antecedent to man's creation. They are also important and interesting from their universality, both in chronological and geographical position, and the similarity which characterizes them whenever and wherever found.

With this brief introduction the subject will be treated in accordance with the divisions proposed.

Division First. The pestles for the preparation of food (a well-known form of stone implement among the North American Indians), are, as far as my observation is concerned, invariably made of the sandstones of the region from which the specimens are derived, and their construction appears to have been as follows :

A water-worn stone was selected, approximated by natural agency and action, the abrasion of moving masses in water, to the desired form. The superabundant material was then removed by a process which may be called "pecking," the characteristic marks of which appear upon a numerous class of instruments, such as pestles, mortars, chisels, &c. It was effected by blows with the sharp points of horn-stone, jasper, or chalcedony, either directly with a mass of those materials held in the hand, or aided by a mallet or club, or secured to wooden handles, by insertion and ligaments of tendon, or lashings of raw hide; the said blows were given in a direction perpendicular to the surface, and not with the tool placed at an angle, as is usual in chipping or dressing marble, thus strongly and plainly marking the surface of the larger and rougher implements, and more delicately those of the smaller or lesser.

From the number of fragments found it is evident that many implements must have been broken under the operation. It is also evident from the numerous unfinished specimens found, that the characteristic unsustained labor of savages caused many to be abandoned with careless indifference in an unfinished state, after considerable time and work had been bestowed upon them.

This manner of working off by crushing the surface, is analogous in principle to the usages of modern 'stonecutters' when working upon sandstone and granite, but it is not adapted to marble, which requires that the tool should be held and struck at an angle (with this marked difference, that they use tools of steel), so as to lift off chips without crushing, and thus destroying the structure of the marble; by the first method noted, unskilful workmen destroy or greatly injure works of art.

After the implement had been brought by *pecking* to the required form, a higher degree of finish was given by rubbing with sandstones,

or by rubbing it upon sandstone rocks until the peck-marks were either partially or wholly obliterated, and the implement thus finished.

It is evident that the higher degree of finish exhibited by the polish of some articles, was the result of a higher grade of workmanship, with materials properly selected, upon principles similar to those employed at the present day.

The operation of *pecking* upon a detached rock confined to a circular space, enabled the patient laborer to work out a cavity capable of receiving a quantity of maize or other grain, and thus a mortar was made; not invariably, however, upon a detached mass, as they have been observed upon rocks in place.

This method of working leaves a mark entirely dissimilar to any produced by natural causes. The rolling of floods has a tendency to remove the angles and corners of broken fragments detached from their beds by frost and water or other elemental causes. Changes of temperature are rounding and smoothing or produce entire disintegration, but the mark made by the above-described means can never, when once observed, be mistaken for anything else than man's work, and the eye that has once carefully observed it will never fail in its recognition. It is also so with the conchoidal fracture of silicious implements, which unmistakably characterizes them; but this subject further pursued would anticipate injudiciously the immediate subject of the third division of this communication.

The second division has been made to embrace the tomahawks, hammers, &c. In this department the simplest and least laborious means have been employed to produce an implement for use. A rude fragment of slate or sandstone was prepared by breaking notches on opposite sides, so that a wooden handle could be attached by splitting the end and inserting the stone, securing it with raw hide in strips or with filaments of tendon, or by bending around the notched stone a withe handle of wood, and securing it as above described. These rude implements are the simplest form of the tomahawk; they are the most abundant of all the relics of the stone period of this country, except arrow and spear heads, and are found in regular gradations, from a simple fragment to chipped forms on a well-established model, and of all sizes from the weight of one half ounce to two or more pounds.

It may sound to the enlightened ear of modern science, like the employment of figurative language or extravagant phraseology, to use the words "agricultural implements" in a dissertation on the articles of the stone period; an age or period, it is well understood, of savage life; yet facts are irresistible, and an exact investi-

gation requires that the means of sustaining life in that lowly condition should have due consideration. Implements for cultivation have been found in situations, and of such forms, as to leave no doubt of the object of their construction. On Depuy's Island, a beautiful alluvial deposit in the Delaware river, in a region popularly known as the "Shawnee Flats," were found a number of circular discs of slate, from 6 to 7 inches in diameter, and one quarter of an inch thick, with notches on opposite sides, evidently designed for securing them to handles of some, as yet unknown construction, but probably withes of wood. The form of these specimens, and the locality on which they were found, leave no hesitation in applying the terms above designated.

In addition, it may be stated that the chisels and axes, as they are familiarly called, were in all probability frequently used for the tilling and cultivation of corn and other food, in the intervals of peace, so rarely permitted, and yet so essential in savage life, as it is in any other condition of our race.

Hammers were made by *pecking* a groove around pebbles of various forms, most frequently ovoid, and attaching a handle by bending around the groove a withe of wood. Over the whole was sewed with filaments of tendon, "*raw hide*" in a green state, leaving only the part to be used exposed, which, after becoming dry, held all firmly together. This method of making a serviceable tool is not conjectural; such implements are still in use among tribes of Indians now existing, made exactly as described, and many of the stone heads have been found of all sizes, from a few ounces in weight to many pounds, assuming the semblance and efficiency of sledges or mauls used by modern mechanics. We are credibly informed, that many of the largest size have been found in excavations of aboriginal origin, in the Lake Superior copper region, upon masses of the native metal, bearing marks of their employment, in the ungrateful task of detaching fragments for use or ornament.

The rude tomahawk described in the first paragraph of this division, gradually assumes a characteristic form, as has previously been observed, by selection of suitable water-worn stones, and in a still more advanced state by chipping, and ultimately by grinding with whetstones into polished weapons of war, alike graceful in form and neat in execution. It may be well to observe at this place, that many of the best forms of tomahawk are somewhat concave on one side, and correspondently convex on the other, whilst others are symmetrical in this respect. The conclusion which may be drawn

from this peculiar construction is, that they were thus formed for convenient and constant wear upon the person (it may be as badges of authority), the curved or hollow side being placed next to the body.

The most perfect in form and execution of the tomahawk is that with a perforation or hole called the eye, in the prototype of the iron period, the hammer and axe of the present age. These implements and others with perforations and excavations, have presented apparent difficulties to modern observers, but it will be conceded that they are not greater than those which will be presented by the third division of the subject under consideration; every portion of it is replete with instruction, and illustrates the ability of man, even in his most degraded condition, to make rocks and stones subservient to his necessities. How grateful should he be to the bountiful Creator, who has made him capable in all conditions of living, but especially so of enjoying life in obedience to revealed laws, which insure comparative happiness whilst on earth, and promise permanent bliss in that which is to come.

The ordinary holes are mere perforations, made by revolving a sharp-pointed flake of jasper, hornstone, or other hard stone, upon the object to be perforated, usually slate, limestone, or soapstone, the perforation being made from opposite sides, until the opening met at the middle, but in other and more finished works, such as those made for the insertion of handles in tomahawks and hammers, and more remarkably in smoking pipes, and the tubes which were probably used for that purpose.

There is no reason to doubt that these holes were made by nearly the same means, and identically the same principles that are now used to drill glass and the hardest gems. A round stick of soft wood was revolved by rubbing the hands against it in opposite directions, with silicious sand and water continually renewed between the end of the stick and the article to be bored.

A further supposition is not unreasonable, that a bowstring loosely drawn and passed around the stick, would give increased motion and more rapid effect to the process.

The pages of Schoolcraft describe and illustrate similar arrangements in use among existing tribes for producing fire by rapid friction.

Another method of perforation it is more than probable was employed, which is well adapted to the boring of loosely aggregated sandstone implements. A fragment of chalcedony, jasper, or hornstone, inserted and secured by cement to the end of the mandril, and revolved by the means previously described. This mode, it will be

observed, is exactly similar in principle to the method of drilling glass with a diamond spark, as at present employed.

There are numerous examples of holes drilled to remarkable depths and with remarkable accuracy, in minerals of considerable hardness; a process that cannot be designated otherwise than as wonderful, when the means and appliances of this rude age are considered.

Division Third. This department embraces much the most characteristic and abundant specimens of the stone period. They are always *chipped*, never in any instance ground and polished into the various forms of spear and arrow heads for war or the chase, or into cutting tools of minerals, more or less suited to the mode of construction and their object.

When the material best suited was not found in the vicinity, there is abundant evidence that it was transported from distant parts, and it is probable that some of the articles which have embarrassed observers and students in this branch of ethnological research, were merely forms prepared for convenient transportation by the removal of unessential portions. It is an inevitable deduction, however, from the art as perfected in the best material, that it enabled those who were adepts, to work slates, sandstones, and imperfectly crystallized quartz, into forms not less remarkable, when their structure is considered, than those made of the minerals best adapted for the purpose.

The process evidently practised in almost all ages of the world has been abandoned or lost in all, when the knowledge of metal superseded the more refractory and less perfect material, but there are tribes on our own continent still who have no other resource; among *them*, the art has been witnessed in a few instances. The gallant Smith, whose memory is embalmed in the romantic history of Pocahontas, gives the first recorded, though brief notice of the art as practised by the Indians of Virginia, in his work entitled "Voyages and Discoveries of Captain John Smith in Virginia, Sixth Voyage, 1606."

"His arrow-head he quickly maketh with a little bone, which he ever weareth at his bracept, of a splint of a stone or glasse in the form of a heart, and these they glew to the end of their arrowes."

One or two other travellers have written upon the subject, but their observations want minute exactitude in matters that do not appear to have been observed. The following description is drawn up from the remarks of an eye-witness, among the Shasty and North California Indians, during that part of the United States Exploring

Expedition involved in a journey by land, after the wreck of the Peacock, from the Columbia river to San Francisco.*

A blow with a round-faced stone repeated upon a mass of jasper, agate, or chalcedony, until a flake was broken off of a suitable form, and which exhibited the right kind of fracture; then the edges were chipped by the application of a notch in a piece of horn, applied as a glazier applies the notches in the side of his diamond handle to the edge of a pane of glass for a like purpose. The notches were of different sizes and depths, and much practice was doubtless requisite to insure success; as in the localities which furnished the material, or where it was worked (many of which spots have been examined), large quantities of flakes, and broken and unfinished spear and arrow-heads are found, proving that many of the efforts were abortive, and no exact form or certain result could emanate from even practised hands.

From specimens observed, it may be presumed that the flaking was begun at the base of the implement and finished at the point; at least, such an inference may be drawn from the appearance of certain specimens in the cabinet of the writer.

The forms of arrow-heads are very much varied: some were made without notches or barbs, and are usually called war-arrows; they were attached to the shaft by cement of resinous gum, which, when withdrawn, would of necessity leave the head in the wound. Others made with barbs or notches were secured by tendon lashings, in many instances put on with extreme neatness and symmetrical interlacing.

There is no limit to the variety of forms which these stone spear and arrow-heads assume. Many of them were rude and rough as the coarse hornstone of which they were made, in fact mere splintered fragments; whilst others, on the contrary, are as perfect in form as the weapon of the classic Greek, and made of the most beautiful jasper or chalcedony, almost gem-like in its beauty of color and shading.

There are instances of forms that lead to the conviction that novelty is one of the rare things of this world, as Solomon knew and told us long ago; this allusion is pointed to arrow-heads constructed with beveled faces, so formed as to cause revolution in their flight, and thus maintain a true direction; a well-known principle employed in the modern rifle.

A crescent form, though rare, is not without examples; evidently intended for the decapitation of birds or a wider range of efficiency.

* Mr. T. R. Peale, of the Scientific Corps, U. S. Exploring Expedition.

Allusion is made in classic writings to an arrow-head of this kind used by an Emperor in some gymnastic exploit in a Roman circus.

Division Fourth. In this department is embraced a variety of articles that are not the least curious and interesting; they are usually the best finished, many of them elaborate in construction and symmetrical in form, and some highly polished; they show that labor and skill were equally taxed in the stone period, rude and impoverished as it may be called, to ornament the person, and to as great an extent as in these days of fashion and refinement.

The devotees of fashion punished themselves by heavy weights carried upon the person, in the form of "gorgets," "canoes," and pendants of slate or other stones, of which, doubtless, they were as vain as our own dames and dandies of bracelets, and chains, and jewelled ornaments.

Beads of quartz, with drilled holes for the string, afford evidence of patient industry that must have been severely taxed, especially as, in many instances, the labor must have been lost by fracture of the material before completion of the article.

Shells and slates were of easier manipulation than the last-named material, and of course most frequently employed in the division under consideration.

Under the head of luxuries, are included the pipes, of the worldwide custom of smoking; among them are the most elaborately executed articles of the stone period. The plainest forms were no doubt made by the means and processes indicated in the preceding part of this paper; but when we take into view the numerous characteristic productions of the mounds, recovered from the hidden repose of centuries untold, we are lost in wonder at the knowledge of nature which they exhibit, and entirely at fault, as to the means of execution which their elaborate construction evinces.

Dr. Emerson described a discovery made by himself some years ago on the tide waters of the Delaware, of a bed of charred human bones, broken up into small fragments, and lying over them many fragments of Indian pipes made of baked clay. A single perfect specimen was of a symmetrical and peculiar form, unlike the well-known forms of Indian pipes discovered elsewhere, inasmuch as its bore was perfectly straight. Dr. Emerson judged these peculiarities to be indications of the greater antiquity and different stirpal origin of the Indians whose remains were here interred.